Space Weather Forecast

Issued on Sunday, 21 August 2022 at 01:13 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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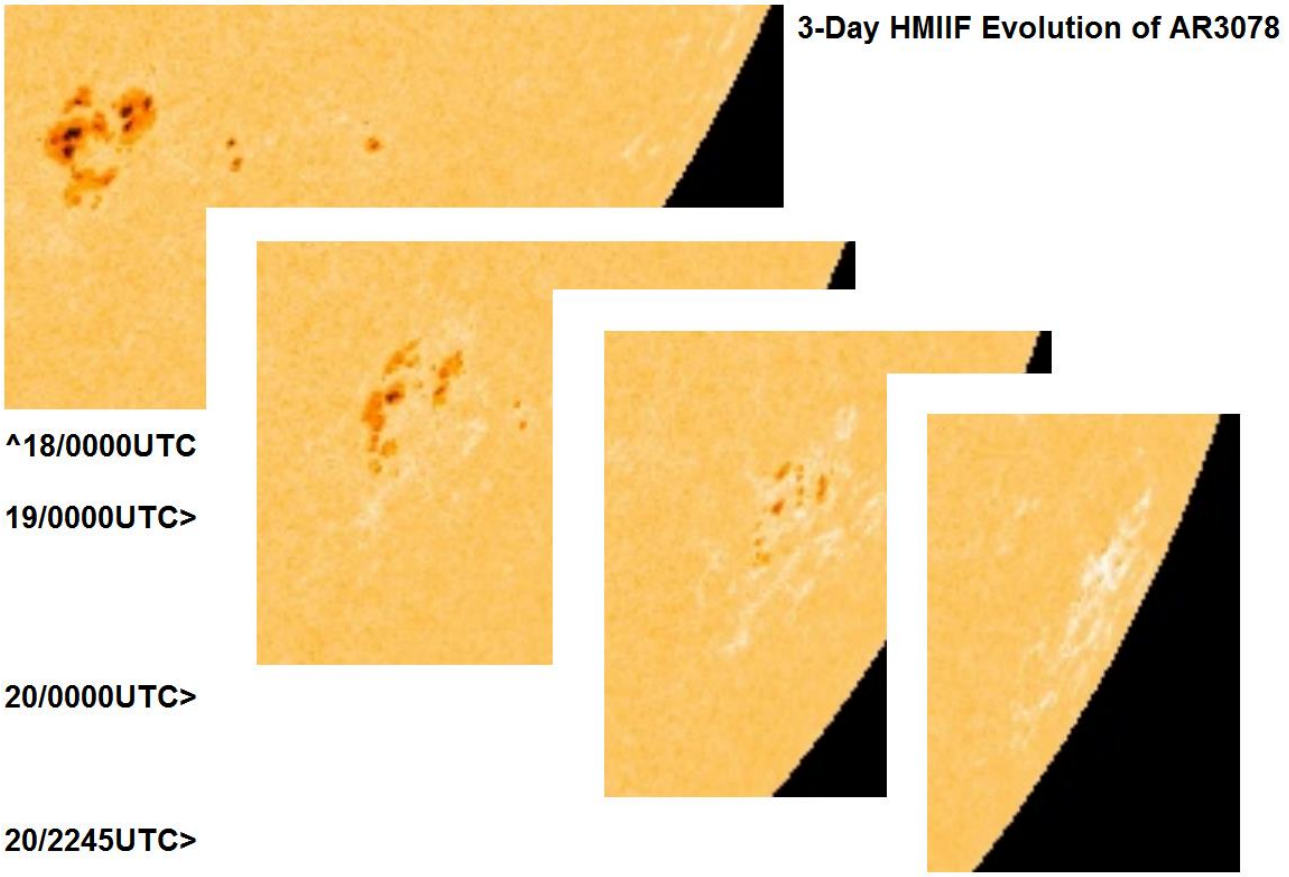
Space Weather Forecast Headline: Chance of Minor Geomagnetic Storm G1 peaking 22 into 23 August. Minor Radio Blackout R1 risk falling.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has fallen to very low over the past 24 hours, with background X-ray flux below even common class, having fallen markedly when compared with the end of the past UTC working week. This trend was strongly tied to the fortunes of the recent most active spot, which showed a fading trend over the past 36 hours as it has neared the southwestern solar horizon.

Figure 1: 3-day visible imagery sequence of the recent most active sunspot group on the sun, 'AR3078'.



This spot group was one of up to five on the Sun at present, with the others mostly simple magnetic dipoles or monopoles. The sole other region of interest, at least on paper, was a bipolar

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group in the northwest, although this spot proved unremarkable in terms of X-ray flares in the period.

The arriving eastern solar hemisphere appears much blander than the departing west in terms of the starkness of opposing magnetic polarities in imagery. The combination of this quieter face becoming increasingly dominant and the fading of activity from across the Sun has led to a notable quietening in the past 24 hours.

No Earth-directed Coronal Mass Ejections (CMEs) were observed in available imagery.

Solar Wind / Geomagnetic Activity: The solar wind speed was symptomatic of both a waning fast wind regime from a coronal hole, and also a minor CME arrival at 20/1725UTC. This followed yet another CME arrival before the start of this reporting period at 19/1702UTC, which had eased by the time the later event took effect.

The solar wind speed initially fell from early strong levels as low as slightly elevated levels, before undergoing a rise to 'elevated' with the passing of the CME from 1725UTC. The associated number of particles in the solar wind showed a relatively flat trend, with the tied magnetic field relatively small-scale but volatile.

The net result of the above solar wind measures on provisional geomagnetic activity was an early and late peak just shy of Minor Storm G1 in the 00-03UTC and 21-24UTC intervals, else being mainly quiet.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be low to very low, with the recent most active sunspot both weakening, and in any case departing the facing side into the new week, with little to compensate on the current face or else arriving over the eastern solar horizon.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast is low confidence throughout, largely the result of the sheer number of mostly minor CMEs from the main recent active sunspot, with some cases of glancing incidence possible, now perhaps most likely on 22 August, with two others having recently arrived (19/1702UTC and 20/1735UTC). Otherwise, the current coronal hole-related fast wind is expected to continue to gradually ease over the current weekend, ahead of a second coronal hole fast wind perhaps incident on Tuesday 23 August.

Geomagnetic activity is expected to be rather quiet for much of the period, but with further spells of G1 Minor Storms due to any CME glances, now thought most likely straddling the UTC days of 22 and 23 August.

Energetic Particles / Solar Radiation: Solar radiation storms are unlikely in the period, with the risk perhaps very slightly above background as a result of the recent active sunspot nearing the better-connecting western solar horizon - should it flare.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	30	30	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	5	5	5
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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